

NOAA mobile laboratory measurements of atmospheric emissions from agriculture in northeastern Colorado

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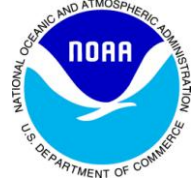
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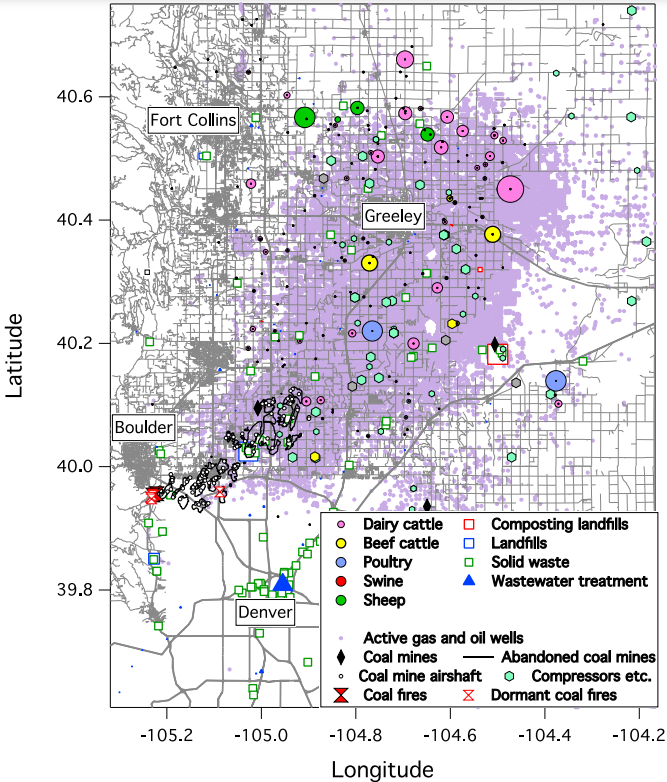


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NOAA mobile lab will contribute to our understanding of agricultural impacts on Front Range air quality

- Primary motivation is to quantify and attribute atmospheric emissions of trace carbon and nitrogen species from various point sources in northeastern Colorado, including:
 - Agricultural sites: feedlots, dairies, swine, chickens, sheep
 - Oil and gas wells
 - Landfills and wastewater treatment
- New mobile laboratory enables high resolution measurements with close proximity to the site of interest.



NOAA/CSD Mobile Laboratory Measurements

Measured Parameter	Method	Time Resolution	Detection Limit
N ₂ O, CO, H ₂ O	Integrated cavity output spectroscopy	1 s	0.2 ppb for N ₂ O 0.2 ppb for CO 100 ppm for H ₂ O
CO ₂ and CH ₄	Wavelength scanned cavity ring-down spectroscopy	1 s	0.2 ppmv for CO ₂ 2 ppbv for CH ₄
NH ₃ and H ₂ O	Cavity ring-down spectroscopy	variable	1 ppb for NH ₃ 0.05% for H ₂ O
NO, NO ₂ , NO _y , O ₃	Cavity ring-down spectroscopy	1 s	0.1 to 0.001 ppbv
WIBS	Single particle fluorescence	1 min	10 ⁵ particles/m ³
GPS and meteorology	Differential GPS and Airmax Vx	1 s	



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Preliminary data show clear diurnal, temperature trends

- A clear diurnal cycle and temperature dependence is observed in the NH_3/CH_4 enhancement ratio at several different feedlots.
- The mean enhancement ratio agrees with EPA NEI 2011, but the magnitude of emissions has not yet been quantified.
- Future work will include seasonal variations in emissions, comparison with oil and gas emissions, and a closer examination of the differences between animal types and manure management practices.

